

REMARKS

Reconsideration and allowance of the present patent application based on the foregoing amendments and following remarks are respectfully submitted.

By this Amendment, claims 1, 8 and 10 are amended, and claims 2 and 9 are canceled without prejudice or disclaimer to the subject matter therein. Claim 1 has been amended to positively recite the limitations of claims 2 and 9. No new matter has been added. After entry of this Amendment, claims 1, 3-8 and 10-23 will remain pending in the patent application.

Claims 1-23 were rejected under 35 U.S.C. §103(a) based on Singh *et al.* (U.S. Pat. No. 6,448,097) (hereinafter "Singh"). The rejection is respectfully traversed.

As a preliminary matter, Applicants note that a plurality of claims should never be grouped together in a common rejection, unless that rejection is equally applicable to all claims in the group. See MPEP 707.07(d). As this application contains 3 independent claims and 20 dependent claims directed to different embodiments of the invention, Applicants point out that the rejection is not equally applicable to all claims in the group. Therefore, the Official Action is not complete as to all matters because the Examiner has not clearly identified a ground of rejection for each claim. Accordingly, in the event the rejection of all pending claims is maintained, the Examiner is respectfully requested to provide in the next Office Action the reasons as to why claims 3-8 and 10-23 are not patentable over the art of record. Otherwise, Applicants respectfully submit that claims 3-8 and 10-23 are in condition for allowance.

Claims 2 and 9 are canceled without prejudice or disclaimer, thus rendering moot the rejection of these claims.

Claim 1 recites a method comprising, *inter alia*, analyzing the photoresist pattern after the applying to detect pattern collapses; and adjusting the predetermined concentration based on the analysis of the pattern collapses. Singh does not teach or suggest a method including these features.

Singh discloses a method employing fluorescent spectroscopy to facilitate control of a chemical trim etch process during development of a photoresist material layer. (See col. 2, lines 2-5). Singh discloses that a photoresist pattern is developed with a developer solution and then rinsed and that a chemical trim solution is applied on the pattern for controllably decreasing the size of the developed resist structures. (See col. 4, lines 64-67 and col. 5, lines 1-2). Singh further discloses that a fluorescent spectroscopy system is employed to detect

one or more CDs after the trim process and that the chemical trimming components can be adjusted if the desired CD has not been obtained. (See col. 5, lines 26-49). Singh is however silent about analyzing the photoresist pattern after applying the developer solution to detect pattern collapses or adjusting the predetermined concentration based on the analysis of the pattern collapses. Singh does not provide any motivation or suggestion to modify the developer solution based on the analysis of pattern collapses. In Singh, the developer solution remains at the same concentration. Only the chemicals of the trim solution are adjusted based on CD measurements.

Therefore, for at least these reasons, Applicants submit that by citing Singh alone, the Examiner has not set forth a proper rejection under 35 U.S.C. §103(a) to maintain that claim 1 is obvious.

Claims 2-6, 8 and 10-16 are patentable at least by virtue of their dependency from claim 1 and for the additional features recited therein.

Claim 17 is patentable over Singh because this claim recites an apparatus for developing a photoresist pattern on a substrate comprising a supply line of concentrated chemical solution; a supply line of solvent; and a nozzle, said nozzle comprising a nozzle body on which a first inlet, a second body and an outlet are arranged; wherein the supply line of concentrated chemical solution is in communication with the first inlet; and the supply line of solvent is in communication with the second inlet. Singh does not teach or suggest an apparatus including these features. Singh does not provide any motivation or suggestion whatsoever to provide such an apparatus. Clearly, by citing Singh alone, the Examiner has not set forth a proper rejection under 35 U.S.C. §103(a) to maintain that claim 17 is obvious.

Claims 18 and 19 are patentable over Singh at least by virtue of their dependency from claim 17 and for the additional features recited therein. In particular, Singh is silent about a nozzle body comprising a mixing flow surface or an apparatus wherein the concentrated chemical solution and the solvent are flowed in the nozzle body in a non-laminar regime.

Claim 20 is patentable over Singh at least because this claim recites a method for optimizing a post develop rinse on a substrate comprising, *inter alia*, mixing, in a fabrication facility where the substrate is processed, a concentrated chemical solution with a solvent to obtain a post develop rinse solution of a predetermined concentration; analyzing the developed photoresist pattern after the applying; and adjusting the predetermined concentration based on analysis of the developed photoresist pattern. Singh does not teach or suggest a method including these features.

As mentioned previously, Singh discloses adjusting chemicals of a trimming solution after CD measurements. Singh discloses that the trim process is carried out after the developing and rinsing step. Singh does not teach or suggest adjusting the rinsing step based on analysis of the developed photoresist pattern. In fact, Applicants note that the rinsing step, in Singh, is maintained constant. There is no motivation or suggestion in Singh to change either of the developing and rinsing steps. Therefore, for at least these reasons, Applicants submit that by citing Singh alone, the Examiner has not set forth a proper rejection under 35 U.S.C. §103(a) to maintain that claim 20 is obvious.


Claims 21-23 are patentable at least by virtue of their dependency from claim 20 and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 1-6, 8, and 9-23 under 35 U.S.C. §103(a) based on Singh are respectfully requested.

The rejection having been addressed, Applicants request issuance of a notice of allowance indicating the allowability of all pending claims. If anything further is necessary to place the application in condition for allowance, Applicants request that the Examiner contact Applicants' undersigned representative at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,
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